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CASE REPORT

Photodynamic therapy for subungual Bowen's disease

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SUMMARY

A 35-year-old police shooting instructor with a 4-year history of Bowen's disease of the nail bed on his right index finger confirmed histologically, was successfully treated with photodynamic therapy (PDT). Four cycles of PDT were used with two different photosensitizers: 20% 5-amino-levulinic acid oil in water emulsion and methyl amino-levulinate (Metvix®) cream. The lesion was successfully treated with clinical and histological clearance. There was minimal loss of time from work, with neither functional nor cosmetic deficits.

Key words: amino-levulinic acid, epidermoid carcinoma, methylaminolevulinate, nail bed, squamous cell carcinoma *in situ*.

INTRODUCTION

When Bowen's disease arises in the nail apparatus, the clinical features are often subtle and delay in diagnosis is common. Treatment modalities including cryosurgery, 5-fluorouracil, Grenz rays, curettage with electrosurgery, CO_2 laser ablation and topical imiquimod are highly effective in treating squamous cell carcinoma *in situ* at other skin sites; however, Bowen's disease of the nail bed is generally refractory to these modalities and surgery is usually required.[1] Mohs' micrographic surgery is the preferred surgical method for Bowen's disease of the nail unit.[2] We present a shooting instructor with subungual Bowen's disease of his trigger finger successfully treated with photodynamic therapy.

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CASE REPORT

A 35-year-old police shooting instructor presented with a 4-year history of an erythemosquamous patch on his right index (trigger) finger tip (Fig. 1). The lesion involved the tip of the finger and extended proximally under the nail and to the lateral nail fold. It was a continual annoyance in his shooting practice. He had previously spent 6 months operating a radar gun with his right hand. He was an otherwise healthy individual with no history of warts or radiotherapy. Previous treatment included over-the-counter wart paints containing salicylic acid, without success. Two biopsies were obtained from the nail bed, and both reported hyperplastic Bowen's disease.

Treatment options, risks and the likelihood of success were discussed with the patient. He was eager to avoid surgery because of the potential impact it would have on his work as a shooting instructor, and agreed to a trial of photodynamic therapy (PDT).

Prior to the treatment, a partial nail avulsion was carried out to expose the affected area and 20% salicylic acid in white soft paraffin was applied nightly for 2 weeks as a keratolytic agent to reduce the amount of scaling and improve the penetration of the photosensitizer. The photosensitizer used was 20% 5-amino-levulinic acid (5-ALA) oil in water emulsion. This was applied under occlusion with Tegaderm® (3M, St Paul, MN, USA) for 4 hours, using aluminium foil as a light protector. Local anaesthesia was given in the form of a digital block with 1% ropivacaine prior to treatment. Omnilux 630 nm (Phototherapeutics Limited, Altrincham, UK) was used as a light source, delivering a dose of 63 J/cm^2. The only discomfort that the patient described was a mild burning sensation in the treated area on the next day. Two further repeat treatments were given at fortnightly intervals with the same photosensitizer and settings. On review at 4 weeks, the finger showed no clinical sign of Bowen's disease; however, it was decided to provide the fourth treatment to ensure adequate treatment for cure. As methylaminolevulinate (Metvix®; Photocure ASA, Oslo, Norway) 160 mg/g cream had become available to us and was reported to cause less postprocedural pain, the fourth treatment was given using Metvix cream® and a similar technique of occlusion, for 3 hours. Curelight® (Photocure

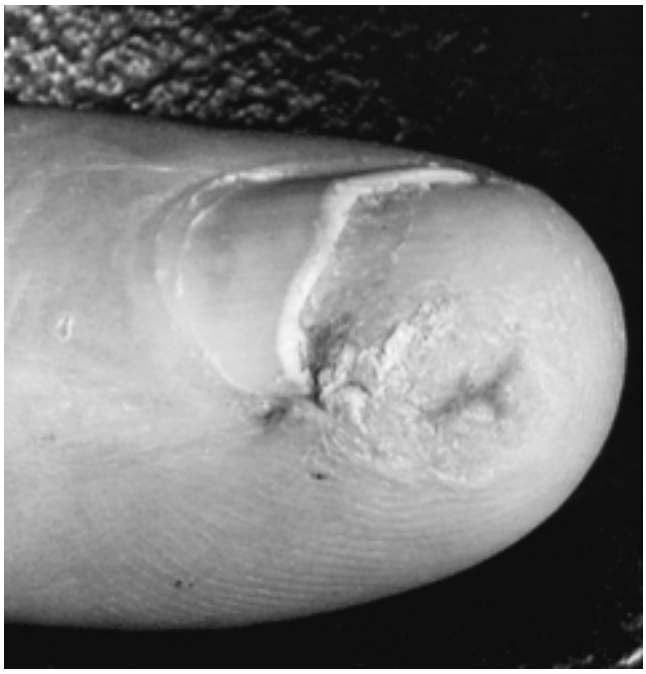

Figure 1 Bowen's disease of the nail at presentation.

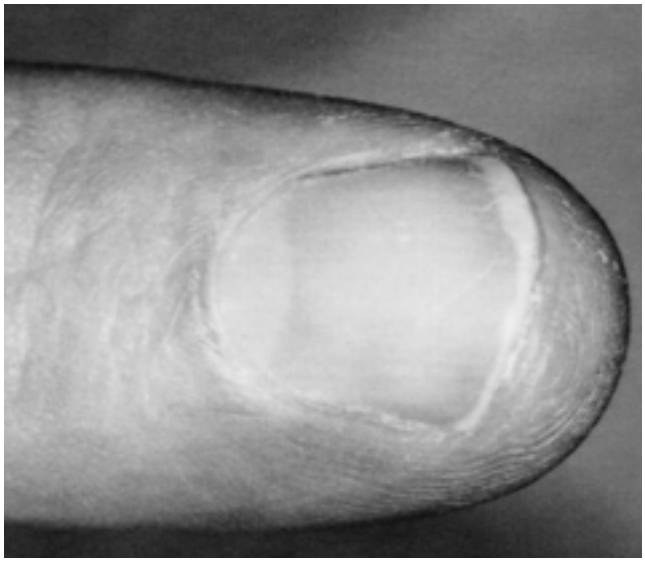

Figure 2 Clinical presentation of the treated finger at 6 months post treatment.

ASA, Oslo, Norway) was used as a light source, delivering a dose of 75 J/cm^2. Ropivacaine 1% was again used as a local anaesthetic agent at the patient's request, prior to illumination. Metvix cream® was used to compare the patient acceptability with the previous photosensitizer. In the case of Metvix cream®, there was no discomfort reported after the treatment.

On completion of the therapy at 4 weeks post treatment, 3-mm punch biopsies from the nail bed and lateral nail fold, at sites guided by the pretreatment clinical photographs, revealed no residual Bowen's disease. There was no evidence of clinical recurrence on review 6 months later (Fig. 2). The patient had no functional impairment and was successfully treated with a total of less than 1 week's absence from work following the 5-ALA treatments.

DISCUSSION

Bowen's disease has been successfully treated with PDT in other skin sites using similar regimens to the first three treatments,[3] but to our knowledge it has not been previously used for Bowen's disease of the nail apparatus. Preferential absorption of 5-ALA by tumour cells confers tumour selectivity. Absorbed 5-ALA is converted to protoporphyrin IX, which accumulates and generates abundant free radicals on exposure to specific wavelengths of light, including 630 nm. This results in lysis of the target cells.

To achieve its effect, both light and 5-ALA must penetrate to the target cells. At the 630 nm wavelength, light penetrates to approximately 3 mm into the skin.[4] The usual depth of Bowen's disease is <3 mm.[5] The penetration of 5-ALA through the intact stratum corneum can be a major limitation in topical PDT. Therefore, we pretreated our patient with 20% salicylic acid following partial nail avulsion to enhance the passage of the photosensitizer across the epidermal keratin layer.

Since our experience with Metvix cream® has increased, we now do not routinely provide local anaesthesia prior to treatment with Metvix cream®. We only administer local anaesthesia on the rare occasion that the patient does experience pain.

The principal advantages of PDT include tumour selectivity, conserving tissue and function in anatomically important areas such as the digit and penis, and achieving good cosmetic outcomes equal to conservative methods. Repeated treatments and concurrent treatment of multiple sites are also possible.

This case shows that topical PDT appears to be a viable option for the treatment of subungual Bowen's disease with excellent cosmetic and functional outcomes. In a case series of Bowen's disease treated with 5-ALA PDT, the recurrence rate was 33% and the majority of lesions recurred by 6 months.[3] Further investigation of this modality in the treatment of Bowen's disease of the nail apparatus is warranted to evaluate long-term cure rates.

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